When Wind Is Reliable: Turbines Help Texans Avoid the Dark

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Last Wednesday morning, rolling blackouts left nearly a million Texans in the dark after abnormally cold temperatures crippled 50 coal and natural gas plants. But without wind power, it could have been much worse.

On one of the coldest days in recent history there, after 4 days of subzero weather during which temperatures dipped to -11°C in some areas, wind turbines played a key role in maintaining power for millions of homes. "We put out a special word of thanks to the wind community because they did contribute significantly through this time frame," said the head of Texas's electrical grid. "We had often 3500 megawatts of wind generation during that morning peak, which certainly helped us."

Wind power is often considered the unreliable source, especially in the summer when winds die down in many American climes. (This op-ed touches on some common criticisms.) So how did wind power come through so well, and does its success last week offer broader lessons?

The events of last Wednesday, detailed here, began when cold air burst pipes, caused low pressure in natural gas lines, and damaged equipment in facilities, including some large coal plants. The grid operator, Electric Reliability Council of Texas, told ScienceInsider that the actual load on the system between 5 and 6 a.m. on 2 February was 52,556 MW. The 50 plants that went down should have been providing some 7000 MW of power; another 12,000 MW in generating capacity was down due to scheduled maintenance.

But the unusually low temperatures didn't prevent the windmills from operating. Between 3500 and 4000 MW was provided by wind turbines in the state, roughly 7% of the demand (wind power makes up about 10% of the state's installed capacity, although at any one time not all of it is working.) Energy economist Ryan Wiser of Lawrence Berkeley National Laboratory in California says that any one wind turbine can fail and that in general the power sources "has a level of unpredictability" greater than for most traditional sources. But, he says, "When a 2000MW [power] plant goes offline, that's a big intermittency."

There's also a cost issue there: wind variability is generally fairly predictable, so so-called nonspinning reserves can be deployed to react when wind power resources are expected to produce less. (For example, a small gas plant can start up in 10 to15 minutes if wind capacity is dropping.) By contrast, power operators must maintain more expensive "spinning reserves" at

power plants to be able to respond to big, unexpected shutdowns of coal, gas, or nuclear plants. That's energy that plants could be selling, but has to be held in reserve just in case.

"I think the broad message is that all types of generators have different characteristics and that they all work together to try and provide a reliable system," engineer Brian Parsons of the National Renewable Energy Laboratory in Golden, Colorado, wrote in an e-mail to Insider. "That said, it is a good thing that wind was able to contribute during a time of grid stress. ... So often we see (possibly overblown) concerns raised regarding wind's negative impact on the grid."

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